BEACON FEN ENERGY PARK

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Glossary

Abbreviation	Description
2008 Act	The Planning Act 2008
AC	Alternating Current
AIS	Air Insulated Switchgear
Applicant	Beacon Fen Energy Park Ltd
BBC	Boston Borough Council
BESS	Battery energy storage system
CCTV	Closed circuit television
DAAD	Design and Access Approach Document
DAD	Design Approach Document
DC	Direct Current
DCO	Development Consent Order
EA	Environment Agency
EIA	Environmental Impact Assessment
EN-1	NPS for Energy
EN-3	NPS for Renewable Energy Infrastructure
EN-5	NPS for Electricity Networks Infrastructure
GIS	Gas Insulated Switchgear
ha	Hectares
HV	High Voltage
IDB	Internal Drainage Board
km	Kilometre
LCC	Lincolnshire County Council
LEMP	Landscape Environmental Management Plan
Low Carbon	Low Carbon Ltd
MW	Megawatts
NGR	National Grid Reference
NIC	National Infrastructure Commission
NKDC	North Kesteven District Council
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
Order	The Beacon Fen Energy Park Order
PCU	Power Conversion Unit
PEIR	Preliminary Environmental Impact Report
PINS	Planning Inspectorate

Abbreviation	Description
Proposed Development	The entire development to be constructed and operated within the Site, as set out in Schedule 1 of the draft DCO
PRoW	Public Right of Way
PV	Photovoltaic
Site	The entire draft Order Limits or red line boundary located approximately 6.5 km northeast of the village of Sleaford and 2.5 km north of Heckington
SoS	Secretary of State

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Executive Summary

1. This Design and Access Approach Document (‘DAAD’) has been prepared by Beacon Fen Energy Park Limited (the 'Applicant') in support of an application for a Development Consent Order (‘DCO’), that has been submitted to the Secretary of State (the ‘SoS’) for the Department for Energy Security and Net Zero, under Section 37 of ‘The Planning Act 2008’ (the ‘2008 Act’).

2. The Applicant is seeking development consent for a ground-mounted solar photovoltaic (‘PV’) electricity generation and battery energy storage system (‘BESS’), together with associated grid connection infrastructure (the ‘Proposed Development’), at an area sited approximately 6.5 km northeast of the village of Sleaford and 2.5 km north of Heckington (the ‘Site’). The Proposed Development would have a generation capacity of approximately 400 megawatts (‘MW’) of electricity, with a 600MW BESS.

3. The Site is made up of the Solar Array Area (comprising the solar PV and BESS infrastructure) the Cable Route Corridor (comprising an electrical connection from the Solar Array Area to the Bicker Fen National Grid 400kV substation) and the Bespoke Access Corridor (for a bespoke access from the A17 to the Solar Array Area). This is termed the Bespoke Access Road.

4. The purpose of this document is to set out how regard has been given to the surrounding context and the principles of ’Good Design’ as set out in the National Policy Statements have been considered and developed throughout the design decision making process, and a good design process followed. The document also sets out the proposed access arrangements for the Proposed Development, including the dedicated road access proposal that has been developed.

5. Beacon Fen Energy Park began its pre application process in early 2023. This document was originally intended as a Design and Access Statement. Following the recent introduction of the Planning Inspectorate’s Nationally Significant Infrastructure Projects: 2024 Pre-application Prospectus (2024)[1] and the concept of the ‘Design Approach Document’, the Applicant has sought to combine relevant elements of design process and design and access outcomes into a single document. Chapter 2 of this document summarises the design related legislative context and policy framework in respect of NSIPs, with particular emphasis on the relevant National Policy Statements. Regard has also been had to local development plan policies, supplementary planning documents and other local design guidance and guidelines.

6. Chapter 3 of this document section describes and appraises the Site’s context. This includes a description of its location and individual areas, including the immediate context within which it sits, the surrounding area and how access is presently achieved. It also explains key local designations relating to the Site and the technical, functional, access and safety-led considerations applicable to certain components of the Proposed Development. Finally, it appraises the characteristics of the Site, including the opportunities and constraints it presents for development.

[1] https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-2024-pre-application-prospectus

7. Chapter 4 of this document sets out the approach that the Applicant has taken to the design of the Proposed Development, to demonstrate the adoption of a good design process.

8. Chapter 5 of this document sets out how the design of the Proposed Development has developed through the pre-application stage, including through consultation.

9. Chapter 6 of this document sets out the intended access arrangements during both construction and operation, including the Bespoke Access Road.

10. Chapter 7 of this document sets out the Applicant's Vision and Design Principles for the detailed design of the Proposed Development, and how these are secured within the **Draft DCO (Document Ref: 3.1)**.

1. Introduction

1.1 Overview

1.1.1 This **Design and Access Approach Document ('DAAD')** has been prepared by Beacon Fen Energy Park Limited (the 'Applicant') in support of an application for a Development Consent Order ('DCO'), that has been submitted to the Secretary of State (the 'SoS') for the Department for Energy Security and Net Zero, under Section 37 of 'The Planning Act 2008' (the '2008 Act').

1.1.2 The Applicant is seeking development consent for a ground-mounted solar photovoltaic ('PV') electricity generation and battery energy storage system ('BESS'), together with associated grid connection infrastructure (the 'Proposed Development'), at an area sited approximately 6.5 km northeast of the village of Sleaford and 2.5 km north of Heckington (the 'Site'). The Proposed Development would have a generation capacity of approximately 400 megawatts ('MW') of electricity, with a 600MW BESS.

1.1.3 The Site corresponds to the entire Order Limits and represents the entire land area required for construction, operation and decommissioning of the Proposed Development. It is made up of the Solar Array Area (comprising the solar PV and BESS infrastructure) the Cable Route Corridor (comprising an electrical connection from the Solar Array Area to the Bicker Fen National Grid 400kV substation) and the Bespoke Access Corridor (for a bespoke access from the A17 to the Solar Array Area). This is termed the Bespoke Access Road.

1.1.4 The Proposed Development falls within the definition of a 'Nationally Significant Infrastructure Project' ('NSIP') under Section 14(1)(a) and Sections 15(1) and (2) of the 2008 Act, as it is an onshore generating station in England that would have a generating capacity greater than 50MW electrical output. As such, a DCO application is required to authorise the Proposed Development in accordance with Section 31 of the 2008 Act.

1.1.5 The DCO, if made by the SoS, would be known as 'The Beacon Fen Energy Park Order 202[]' (the 'Order').

1.2 The Applicant

1.2.1 The Applicant is a subsidiary of Low Carbon Ltd ('Low Carbon'). Low Carbon is a privately-owned global renewable energy company.

1.3 The Site

1.3.1 The Site represents the entire proposed Order Limits and is located east of Sleaford in Lincolnshire. It extends to approximately 758ha and comprises of three functional areas: the Solar Array Area, the Cable Route Corridor and the Bespoke Access Corridor.

Solar Array Area

1.3.2 The Solar Array Area is approximately 529ha in size and located to the north of Heckington, centred at the National Grid Reference ('NGR') 514682 347825. The Solar Array Area is located wholly within the administrative areas of North Kesteven District Council ('NKDC') and Lincolnshire County Council ('LCC').

1.3.3 The Solar Array Area predominantly comprises agricultural land in arable use, divided by ditches with sparse tree cover that is limited to small woodland blocks and scattered hedgerow trees. A small reservoir is located in the south-west of the Solar Array Area.

1.3.4 The Solar Array Area is bound to the south, west and north by local highways, and bound to the east by the Car Dyke. Public Right of Way ('PRoW') Ewer/12/1 extends across the north-eastern corner of the Site, close to the northern Site boundary. There are no other PRoW within the Solar Array Area.

1.3.5 Villages near to the Solar Array Area include:

- Howell immediately to the south-west, with Heckington c. 1.7km beyond;
- Ewerby Thorpe immediately to the west, with Ewerby c. 1.1km beyond;
- Anwick c. 2.7km to the north-west;
- North Kyme c. 2.4km to the north; and
- South Kyme c. 1.5km to the east.

Cable Route Corridor

1.3.6 The Cable Route Corridor is approximately 183 ha in size and extends c. 13km south-east from the Solar Array Area to Bicker Fen substation, at NGR TF 19684 38599. The Cable Route Corridor is located wholly within the administrative area of LCC. The majority of the Cable Route Corridor is located within the administrative area of NKDC; however, the southern section is located within BBC's administrative area.

1.3.7 Land use within the Cable Route Corridor is predominantly agricultural. A number of local highways cross the Cable Route Corridor, and the A17 crosses east to west within the north-west section of the Corridor. The railway linking Heckington west to Sleaford and east to Swineshead intersects the mid-section of the Corridor. There are a number of PRoW within the Cable Route Corridor, including one alongside the South Forty Foot Drain which also crosses the Cable Route Corridor.

Bespoke Access Corridor

1.3.8 The Bespoke Access Corridor is approximately 45.4 ha in size comprising predominantly agricultural land and extends approximately 3km south-west from the Solar Array Area to the A17. The Bespoke Access Corridor is located wholly within the administrative areas of LCC and NKDC.

1.3.9 Asgarby Road and Heckington Road cross the Bespoke Access Corridor and there are four PRoWs located within the route.

1.4 The Proposed Development

1.4.1 The main components of the Proposed Development are summarised below.

Solar Array Area

1.4.2 The Solar Array Area consists of solar PV panels and modular ground-mounting structures. The height of the panels considered will be up to 3.9m above ground level in fields to the east and 3.5m above ground level in fields to the west, south and an isolated field in the north. The proposal is for a fixed (i.e., static) panel orientation, facing due south, which is commonly seen on existing UK solar farms, and angled 10° to 45° from horizontal. Supporting infrastructure includes inverters, combiner boxes, transformers and switchgear converting the Direct Current ('DC') to Alternating Current ('AC') and stepping up the voltage so it can be exported to the national grid. An inverter, transformer and switchgear comprised together is termed a Power Conversion Unit ('PCU').

1.4.3 A 600MW BESS adjacent to the On-Site Substation is included in the Proposed Development within the Solar Array Area. This will allow the electricity generated by the panels to be stored on site at times when grid demand is low, then exported at times of higher demand. The BESS containers and switch rooms are anticipated to be up to 8m x 3m in size, with a height of up to 4.5m.

1.4.4 Low voltage onsite electrical cabling is required to connect the PV modules and BESS to the inverters, and the inverters to the onsite transformers. Higher voltage cables are required between the transformers and the switchgear and from switchgear to the substation.

1.4.5 A new onsite substation is proposed and would have up to four High Voltage (HV) transformers with a maximum footprint of no more than 40,000m2 (e.g. 250m x 160m (or 200m x 200m)) and a height of up to 13m). The substation will include a 33kV switchroom, control and storage buildings that would house office space and welfare facilities, as well as operational monitoring and maintenance equipment and equipment for reactive compensation and/or harmonic filtering. The design control building and office/welfare will be defined as part of detailed design.

1.4.6 The perimeter fence would likely comprise a standard post and wire, deer fencing up to 3m tall around the Solar Array Area. Security fencing, up to 3.4m will be installed around the Onsite Substation compound and, possibly, other infrastructure / compounds. Acoustic fencing, up to 4m tall, may be required around the BESS, subject to the detailed design and layout.

1.4.7 Mounted internal-facing closed-circuit television (CCTV) systems will likely be deployed around the perimeter of the operational areas of the Site; anticipated to be 5m high. The CCTV cameras would have fixed view sheds and will be aligned to face along the fence. Motion detection security lighting will be used around the electrical infrastructure and potentially at other pieces of critical infrastructure.

1.4.8 During construction, temporary construction compounds will be required, as well as temporary roadways, to enable access to all the land within the Site.

Localised earthworks to form suitable development platform for the substation and BESS will also be required.

1.4.9 There will be one primary access on the western edge of the Solar Array Area and a secondary access to the north, both of which will allow large vehicles (including first responder access to the BESS and on-site substation). Tertiary operational access primarily for smaller vehicles is provided to the north west and south.

1.4.10 PRoW Ewer/12/1 is being extended in a south and westerly direction as a permissive path terminating in the vicinity of Ewerby Thorpe and will be in place for the operational duration of the Proposed Development. The exact route of the permissive path will be determined via the discharge of requirement in the **Draft DCO (Document Ref: 3.1)**, but it is anticipated to run in a south easterly direction along Car Dyke and then heading south west on the north side of Hodge Dike. An undetermined number of footbridges (unlikely to be more than 8 in number) to cross existing watercourses will be required and will require the usual water course crossing agreements/consents to be sought with the relevant Internal Drainage Board in parallel with the discharge of the requirement.

Cable Route

1.4.11 The Cable Route running between the Solar Array Area and the Bicker Fen 400kV Substation will be constructed through trenched methods and, where required, trenchless methods.

1.4.12 During construction, temporary construction compounds will be required approximately every 1-3 km, as well as temporary roadways, to enable access to all land. It is anticipated that there will be 6 main compounds that are distributed at approximately equal distances along the cable route to facilitate proper construction management. Smaller temporary compounds may also be located anywhere within the final working area.

1.4.13 Vegetation and hedgerows lost during the construction of the Cable Route will be re-instated where possible in relation to easement restrictions.

Bespoke Access Road

1.4.14 A dedicated access from the A17 to the Solar Array Area is required. The Bespoke Access Road will be constructed in advance of material construction commencing on the Solar Array Area and will facilitate construction in that area. During construction, temporary construction compounds will be required which may be anywhere along the route.

1.4.15 The Bespoke Access Road will likely be the last component of the Proposed Development to be removed as it will be used to facilitate decommissioning of the Solar Array Area. Whilst it is assumed for this assessment that the road will be removed, it is possible that engagement with the landowners at that time will establish a preference for it to be retained. Optionality has been deliberately retained in the Application to facilitate such a scenario.

1.4.16 There will be no permanent lighting installed, and access will be controlled through gates at all stages.

1.4.17 Vegetation and hedgerows lost during the construction of the Bespoke Access Road will be re-instated.

In any or all of the above areas

1.4.18 Along with the above, in any or all of the three areas, the Proposed Development will include the following (subject to certain requirements):

- Access tracks of between 3.5m to 9m width for construction access and routine maintenance when operational. Access tracks located adjacent to drainage ditches will incorporate the necessary ecological;
- Environment Agency (EA) and/or Internal Drainage Board (IDB) buffers where required;
- Boundary treatments, means of enclosure, security measures, and paths;
- Landscaping and reinstatement planting and Biodiversity Net Gain related habitats;
- Flood resilience measures including swales and storm water attenuation, and works to existing irrigation systems;
- Utility diversions;
- Bunds, embankments, protective works to buildings, maintenance and improvement of streets; and
- Construction related (and decommissioning related) work sites.

Bicker Fen Substation Works

1.4.19 The extension of Bicker Fen substation will include a new generation bay, a new generation bay control room and a perimeter access road. A new generation bay will also include electrical equipment required for connection to the transmission system.

1.4.20 National Grid Electricity Transmission plc ('NGET') have requested that there be optionality within the design of the extension to Bicker Fen substation. The two design options that have been assessed in the Environmental Statement and included in the Application are: Air Insulated Switchgear ('AIS') and Gas Insulated Switchgear ('GIS').

Draft Development Consent Order

1.4.21 The Proposed Development is described in detail in Schedule 1 to the **Draft DCO (Document Ref: 3.1)**, and the areas in which each component (the 'Work Numbers') may be constructed are shown on the **Works Plan (Document Ref: 2.4)**.

1.4.22 The Proposed Development is split into 10 Work Numbers as follows:

- Work No. 1 – a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts;
- Work No. 2 — a battery energy storage system compound and associated works (including fire safety infrastructure);
- Work No. 3 — development of an onsite substation and associated works;
- Work No. 4 — works in connection with electrical cabling and associated compounds;
- Work No. 5 — works to the existing Bicker Fen National Grid substation to create a new generation bay and substation extension;

- Work No. 6 — various ancillary works relating to the Solar Array Area, including cabling, fencing, security features, access tracks, watercourse crossings and landscaping and biodiversity mitigation measures;
- Work No. 7 — construction and decommissioning compounds in connection with Work Nos. 1, 2 and 3;
- Work No. 8 — works to create the Bespoke Access Road;
- Work No. 9 — areas of habitat management; and
- Work No. 10 — works to facilitate access to Work Nos. 1 to 9.

1.4.23 In addition, Schedule 1 to the **Draft DCO (Document Ref: 3.1)** lists other associated works (referred to as "further associated development") which may be carried out in connection with the construction of Work Nos. 1 to 10.

1.5 The Development Consent Order Process

1.5.1 As a NSIP, the Applicant is required to seek a DCO to obtain planning and other powers to construct, operate and maintain the generating station, in accordance with Section 31 of the 2008 Act. Sections 42 to 48 of the 2008 Act govern the consultation that an applicant must carry out before submitting an application for a DCO and Section 37 of the 2008 Act governs the form, content and accompanying documents that are required as part of a DCO application.

1.5.2 An application for development consent for the Proposed Development will then be submitted to the Planning Inspectorate ('PINS') acting on behalf of the SoS. Subject to the Application being accepted (which will be decided within a period of 28 days following receipt of the application), PINS will then examine it and make a recommendation to the SoS, who will then decide whether or not to make (grant) the DCO.

1.6 Purpose of this Document

1.6.1 The purpose of this document is to set out how regard has been given to the surrounding context and the principles of 'Good Design' as set out in the National Policy Statements have been considered and developed throughout the design decision making process, and a good design process followed. The document also sets out the proposed access arrangements for the Proposed Development, including the dedicated road access proposal that has been developed. The Applicant intended to prepare a Design and Access Statement to document the design process adopted and the access solution proposed. In October 2024 the Planning Inspectorate's Nationally Significant Infrastructure Projects: 2024 Pre-application Prospectus (2024)[2] was published including new pre application documentation including Design Approach Documents ('DAD'). This is one of various documents described as *"supplementary pre-application components supportable by the Planning Inspectorate to optimise applications".* The 2008 Act and related regulations do not mandate either a DAS or a DAD.

1.6.2 The pre application process for the proposed Development began in March 2023 and it is not possible for all elements of a DAD to be applied retrospectively; in addition, the DAD format may not give sufficient recognition

[2] https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-2024-pre-application-prospectus

of the bespoke access proposals for the Proposed Development. The Applicant has therefore merged certain components of each document into this document. An appendix contains the Outline Design Principles which represent a commitment secured in the **Draft DCO (Document Ref: 3.1)** and reflect the design parameters on which the "reasonable worst case scenario" assessment has been undertaken in the **Environmental Statement (Document Ref 6.1 – 6.4)**.

1.6.3 This document describes the landscape and built context of the Site, the functional components of the Proposed Development, along with the rigorous technical, functional, access and safety-led considerations applicable to certain components, the good design process adopted by the Applicant, the proposed access arrangements during construction and operation, and principles and a Vision for Good Design that are secured in the **Draft DCO (Document Ref: 3.1)**.

2. Good Design in Policy

2.1.1 This section summarises the design related legislative context and policy framework in respect of NSIPs, with particular emphasis on the relevant National Policy Statements. Regard has also been had to local plan policies and other local design guidance. Planning policy more generally is considered within the **Planning Statement (Document Ref: 5.5)**.

2.1.2 Furthermore, Annex A of Nationally Significant Infrastructure Projects: Advice on Good Design[3] (Planning Inspectorate, 2024) sets out 'Good design issues to consider' before submitting a NSIP application for examination.

2.2 National Policy Statements

2.2.1 The planning policy framework for examining and determining applications for NSIPs is provided by a suite of National Policy Statement ('NPSs'). Section 104 of the 2008 Act confirms that where NPSs are in place (as is the case for the Proposed Development), these shall be the primary basis for decisions by the SoS on applications for NSIPs.

2.2.2 Policy relating to design contained with the NPSs of relevance to the Proposed Development is set out below.

2.2.3 The NPSs were published in November 2023, and were designated in January 2024, around ten months after the inception of the pre application stage for the Proposed Development.

Overarching NPS for Energy (EN-1)

2.2.4 The Overarching NPS for Energy[4] ('EN-1') establishes the need for nationally significant energy infrastructure and sets out certain assessment principles and criteria against which applications for such infrastructure should be considered. This includes Section 4.7 'Criteria for good design for energy infrastructure'. NPS EN-1 'has effect' for the Proposed Development meaning it is the primary policy applicable.

2.2.5 Paragraph 4.7.1 recognises that while the visual appearance of a development is sometimes considered to be the most important factor in good design, high quality and inclusive design does far beyond aesthetic considerations. The functionality of buildings and infrastructure, including fitness for purpose and sustainability, are as equally important. It goes on to state that applying good design to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates 'good aesthetic' as far as possible.

2.2.6 It is acknowledged, however, in paragraph 4.7.2 that *"…the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.*"

2.2.7 Paragraph 4.7.3 of EN-1 notes that good design is also a means by which many policy objectives in EN-1 can be met, for example, good design, in terms

[3] https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-good-design
[4] https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

of siting and use of appropriate technologies can help mitigate adverse impacts such as noise.

2.2.8 Paragraph 4.7.5 of EN-1 expects design principles to be established and that applicants should consider how their design principles can be applied post-consent.

2.2.9 Paragraph 4.7.6 recognises that "*Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area. Applicants should also, so far as is possible, seek to embed opportunities for nature inclusive design within the design process*".

2.2.10 Paragraph 4.7.7 stresses the importance of applicants being able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved. However, it is clear that in considering applications the SoS should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements that the design has to satisfy.

2.2.11 Paragraph 4.7.10 confirms that in assessing applications, the SoS will need to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be. In doing so, paragraph 4.7.11 states that the SoS should be satisfied that *"...the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located , any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible."*

NPS for Renewable Energy Infrastructure (EN-3)

2.2.12 The NPS for Renewable Energy Infrastructure[5] ('EN-3') highlights the importance of good design throughout the planning, construction, and operational phases of solar and battery projects, ensuring that these developments are sustainable, visually acceptable, and environmentally sensitive. This includes Section 2.5 'Consideration of good design for energy infrastructure'.

2.2.13 NPS EN-3 'has effect' for the Proposed Development meaning it is the primary policy applicable.

2.2.14 Paragraph 2.5.2 states that proposals should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage.

2.2.15 NPS EN-3 identifies in section 2.10 (paragraphs 2.10.18 – 2.10.48) that, in respect of solar voltaic generation, a number of factors may influence site

[5] https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

selection and design, recognising that most renewable energy resources can only be developed where that resource exists and is economically feasible. However, locational constraints do not exempt applicants from balancing good design considerations. The document stresses that applicants should aim to avoid, reduce, and mitigate adverse environmental effects through thoughtful site selection, layout design, and operational management.

2.2.16 In particular in terms of site layout and design at paragraphs 2.10.60 – 2.10.63 it states that:

"[A]pplicants will consider several factors when considering the design and layout of sites, including proximity to available grid capacity to accommodate the scale of generation, orientation, topography, previous land–use, and ability to mitigate environmental impacts and flood risk.

For a solar farm to generate electricity efficiently the panel array spacing should seek to maximise the potential power output of the site. The type, spacing and aspect of panel arrays will depend on the physical characteristics of the site such as site elevation.

In terms of design and layout, applicants may favour a south- facing arrangement of panels to maximise output although other orientations may be chosen. For example, an east-west layout, whilst likely to result in reduced output compared to south-facing panels on a panel-by-panel basis, may allow for a greater density of panels to compensate and therefore for generation to be spread more evenly throughout the day.

It is likely that underground and overhead cabling will be required to connect the electrical assets of the site, such as from the substation to the panel arrays or storage facilities."

NPS for Electricity Networks Infrastructure (EN-5)

2.2.17 Paragraph 2.4.2 of the National Policy Statement for electricity networks infrastructure[6] ('EN-5'), as with EN-3, refers to the principles of good design set out at Section 4.7 of EN-1.

2.2.18 NPS EN-5 does not 'have effect' for the Proposed Development as an electricity networks NSIP is not part of the DCO application but is considered to be 'important and relevant' as defined in section 104 of the 2008 Act in relation to the works of associated development to the existing Bicker Fen 400kV substation.

2.2.19 Paragraph 2.4.3 of EN-5 states that *"the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure."*

2.2.20 Paragraph 2.4.4 of EN-5 states that *"While the above principles should govern the design of an electricity networks infrastructure application to the fullest possible extent – including in its avoidance and/or mitigation of potential adverse impacts (particularly those detailed in Sections 2.9 below) – the functional performance of the*

[6] https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

infrastructure in respect of security of supply and public and occupational safety must not thereby be threatened."

2.2.21 Paragraphs 2.9.16 – 2.9.19 discuss the Holford Rules, which are guidelines for the routing of new overhead lines, while 2.10.5 goes on to state that networks infrastructure should be undergrounded where possible but acknowledging it is not always possible provides principal opportunities for mitigating adverse landscape and visual impacts of electricity networks infrastructure.

2.3 Local Planning Policy

2.3.1 The Proposed Development is located within the administrative areas of Lincolnshire County Council ('LCC'), and primarily within North Kesteven District Council ('NKDC') with the southern area of the Cable Route Corridor located in the area of Boston Borough Council ('BBC').

2.3.2 The Solar Array Area is located wholly within the administrative area of NKDC, while above ground infrastructure works related to the substation is located wholly within the administrative area of BBC.

Central Lincolnshire Local Plan

2.3.3 The development plan for NKDC comprises the Central Lincolnshire Local Plan (2023)[7] which expects that good design should be at the heart of every development, and development should meet the aspiration for quality and sustainability in its design.

2.3.4 The policies of most relevance to design are considered to be:

- S5, Part E – Development in the Countryside (Part E: Non-residential development)
- S14 – Renewable Energy;
- S15 – Protecting Renewable Energy Infrastructure;
- S16 – Wider Energy Infrastructure;
- S20 – Resilient and Adaptable Design;
- S47 – Accessibility and Transport;
- S48 – Walking and Cycling Infrastructure;
- S53 – Design and Amenity;
- S57 – Historic Environment;
- S59 – Green and Blue Infrastructure Network;
- S60 – Protecting Biodiversity and Geodiversity;
- S61 – Biodiversity Opportunity and Delivering Measurable Net Gains; and

[7] https://www.n-kesteven.gov.uk/central-lincolnshire/adopted-local-plan-2023

- S66 – Trees, Woodland and Hedgerows.

2.3.5 Further consideration relating to all relevant policies can be found in the **Planning Statement (Document Ref: 5.5)**.

South East Lincolnshire Local Plan

2.3.6 The development plan for BBC comprises the South East Lincolnshire Local Plan (2019)[8] which states that good design has a role in achieving sustainable development and adapting to or mitigating climate change.

2.3.7 The policies of most relevance to design are considered to be:

- 2 – Development Management;
- 3 – Design of New Development;
- 4 – Approach to Flood Risk;
- 5 – Meeting physical infrastructure and service needs;
- 28 – The Natural Environment;
- 29 – The Historic Environment;
- 30 – Pollution;
- 31 – Climate Change and Renewable and Low Carbon Energy; and
- 32 – Community, Health and Wellbeing.

2.3.8 Further consideration relating to the wider array of design and non-design related policies can be found in the **Planning Statement (Document Ref: 5.5)**.

2.4 The National Infrastructure Commission's Four Principles of Good Design

2.4.1 The National Infrastructure Commission ('NIC') is an executive agency that reports into HM Treasury and provides impartial advice on national and long-term infrastructure needs and delivery. The NIC have published Design Principles for National Infrastructure (2020)[9] which set out four overarching principles to set an ambitious vision for design of national infrastructure. These principles are summarised below.

Climate

2.4.2 This principle relates to mitigating greenhouse gas emissions and adapting to climate change. It seeks to ensure opportunities are taken during design and construction to enable decarbonisation, including mitigating and offsetting residual impacts, within and outside the site boundary. It also makes reference to flexibility and adaptation to ensure resilience against climate change.

[8] [redacted]

People

2.4.3 This principle relates to reflecting what society wants and sharing benefits widely. It states infrastructure should be designed for people to a human scale, and makes reference to accessible, enjoyable and safe spaces. It states that a range of views should be taken into account and reflected in design, and engagement should be diverse, open and sincere. It goes on to state good design will plan for future changes in demographics and population.

Places

2.4.4 This principle relates to providing a sense of identity and improving our environment. It states that well-designed infrastructure supports the natural and built environment and should respect and enhance local culture and character without being bound by the past. It goes on to state that good design should support local ecology and deliver a Biodiversity Net Gain.

Value

2.4.5 This principle relates to achieving multiple benefits and solving problems well. It states that good design adds value and ensures opportunities for economic, environmental and social benefits inside and outside the red line boundary are pursued and also seeks to solve multiple problems with single solutions.

2.5 Planning Inspectorate's Good Design Issues to Consider

2.5.1 'Good Design Issues to Consider' are found at Annex A[10] of the Planning Inspectorate's Nationally Significant Infrastructure Projects: Advice on Good Design (2024). These set out the considerations relating to good design which applicants should consider before applying for acceptance under section 55 of the Planning Act. These set out a number of 'Issues' and a number of design considerations against each Issue.

2.5.2 As set out, this document comprises the DAD, and earlier parts of this section of the report discuss the NPSs and NIC principles of good design. The Outline Design Principles which will feed into the delivery of the Proposed Development and ensure an integrated design approach are included at Appendix 1 of this document and how this is secured is discussed in Section 7 of this document.

2.5.3 Analysis and Research relating to the Site is included in Section 3 of this report and throughout the application. The **Environmental Statement (Document Ref: 6.1 – 6.4)** sets out the environmental effects of the Proposed Development and how these have been considered and addressed. The design vision and how the design has developed, including references to place, is set out in Sections 4 and 5 of this document.

2.5.4 The Proposed Development has undergone a considerable amount of consultation, in accordance with the requirements of the 2008 Act and as set out in the **Consultation Report** and its appendices **(Document Ref: 5.1)** with statutory consultees, local authorities, communities and affected persons with

[10] https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-good-design#annex-a--good-design-issues-to-consider

an interest in the land comprising the Order Limits, which has fed into the design as set out in Section 5.3 of this report. While the design of the Proposed Development has not been subject to an independent design review, the professional disciplines and skill sets which fed into the design of the Proposed Development included experienced solar park designers, experts in a number of environmental disciplines and experienced infrastructure planners.

3. Overview and Appraisal of Order Limits and Surroundings

3.1.1 This section describes and appraises the Site's context. This includes a description of its location and individual areas, including the immediate context within which it sits, the surrounding area and how access is presently achieved. It also explains the planning context for the Site. Finally, it appraises the characteristics of the Site, including the opportunities and constraints it presents for development.

3.1.2 The location and extent of the different parts of the Site are described in Section 1.5 of this document and are shown on the **Works Plan (Document Ref: 2.4)**.

3.2 Site Location

3.2.1 The Site in its entirety is approximately 757.6 hectares (ha), comprised of a 529.2 ha Solar Array Area (including the BESS and Onsite Substation), a 45.4 ha Bespoke Access Corridor between the A17 and the Solar Array Area and an approximately 13-kilometre ('km'), 183.1 ha Cable Route Corridor between the Solar Array Area and the existing Bicker Fen National Grid 400kV Substation lying 2.3 km west of Bicker Fen. The location of the Site is shown in the **Location Plan (Document Ref: 2.1)**.

3.2.2 More information on the different parts of the Site is included in Section 1.4 of this document. The planning history of the Site is described in the **Planning Statement (Document Ref: 5.5)**.

3.2.3 The Solar Array Area comprises agricultural land and is notable for its relative lack of hedgerows and trees and its abundance of ditches and dykes with engineered embankments. It contains a PRoW which exists on the map but is cut-off from the remainder of the PRoW network as there is no bridge across the ditch.

3.2.4 It is notable that there are a number of overhead lines on the skyline, which are visible along most of the Cable Route Corridor in addition to the high-voltage direct current converter station constructed as part of the National Grid Viking Link Interconnector and associated roadways. Furthermore, numerous committed developments, including solar and BESS, have been identified along the Cable Route Corridor.

3.2.5 The topography of the Bespoke Access Corridor is generally considered to be relatively undulating while on the definitive map there is a fragmented PRoW along it.

3.3 Planning and Environmental Designations

3.3.1 The following documents form the development plan for local applications in these areas:

- South East Lincolnshire Local Plan 2011-2036;
- Central Lincolnshire Local Plan (adopted April 2023); and

- Lincolnshire Minerals and Waste Plan (Core Strategy and Development Management Policies adopted 2016 and Site Locations adopted 2017).

3.3.2 In the South East Lincolnshire Local Plan, which covers the part of the Site located within BBC's administrative area, the Site is within the designated Countryside and the Cable Route Corridor crosses through a Local Wildlife Site.

3.3.3 In the Central Lincolnshire Local Plan, which covers the portion of the Site located within NKDC's administrative area, the Solar Array Area is partially located within a Designated Rural Area and partially located within a designated Location suitable in principle for large scale wind turbines. The Cable Route Corridor also largely passes through the same two designations. The Bespoke Access Corridor is largely located within the Designated Rural Area.

3.3.4 In the Lincolnshire Minerals and Waste Plan, part of the Solar Array Area is located in a Sand & Gravel Mineral Safeguarding Area.

3.3.5 There are no statutory environmental designations within the Site. The only statutory designated site within 5 km of the Site is the Horbling Fen Site of Special Scientific Interest (SSSI) located 4.1 km south-east. There are ten Local Wildlife Sites within 2 km of the Site, including Great Hale Eau and South Forty Foot Drain which the Cable Route Corridor intersects. More information can be found in **ES Chapter 7 Ecology (Document Ref: 6.2, ES Vol. 1, 6.2.7)**.

3.3.6 The north-east and east of the Solar Array Area and the mid and southern section of the Cable Route Corridor are located within Flood Zones 2 and 3 as shown on public mapping from the Environment Agency. Further modelling has been carried out by the Applicant for the Solar Array Area which has established that the flood risks are in general lower compared to those in the public mapping. Further information is provided within **ES Chapter 11 Water Resources** (**Document Ref: 6.2, ES Vol. 1, 6.2.11**).

3.3.7 Within 2km of the Order Limits lie 67 Listed Buildings including six Grade I and five Grade II* Listed Buildings. There are also six Scheduled Monuments and two conservation areas. Further information is provided within **ES Chapter 8 Cultural Heritage (Document Ref: 6.2.8)**.

3.3.8 There are a number of key sensitive receptors relating to archaeology within the Order Limits including a Victorian Pumping Station and Car Dyke, which runs along the eastern boundary of the Solar Array Area.

3.3.9 The key sensitive receptors with the vicinity of the Order Limits comprise:

- Remains of medieval monastery, moated manor house, fishponds and post-medieval garden, a Scheduled Monument (located in South Kyme);
- Churchyard Cross, St Oswald's Churchyard, a Scheduled Monument;
- Church of St Andrew, Asgarby, a Grade I Listed Building;
- Kyme Tower, a Grade I Listed Building;
- Church of St Andrew, Ewerby and Evedon, a Grade I Listed Building;
- Church of St Andrew, Heckington, a Grade I Listed Building;
- Church of St Mary and All Saints, a Grade II* Listed;
- Church of St Oswald, Howell, a Grade II* Listed Building;

- Church of St Denys, Kirkby la Thorpe, a Grade II* Listed Building;
- Rookery Farmhouse, a Grade II Listed Building;
- The Old Rectory, a Grade II Listed Building;
- Boughton House, a Grade II Listed Building;
- Asgarby Hall, a Grade II Listed Building;
- Howell Hall, a Grade II Listed Building;
- Austhorpe Farm, Grade II Listed Building;
- Thorpe House, a Grade II Listed Building;
- The Manor, a Grade II Listed Building;
- Heckington Station Conservation Area; and
- Heckington Village Conservation Area.

3.4 Surrounding Area

3.4.1 There are a small number of individual properties situated at the fringes of the Solar Array Area. Nearby villages to the Solar Array Area include:

- Howell immediately to the south-west, with Heckington c. 1.7km beyond;
- Ewerby Thorpe immediately to the west, with Ewerby c. 1.1km beyond;
- Anwick c. 2.7km to the north-west;
- North Kyme c. 2.4km to the north; and
- South Kyme c. 1.5km to the east.

3.4.2 A single residential property, Gashes Barn, and its grounds (including a driveway), are situated in the north east corner of and enclosed by part of the Solar Array Area. The residential property is currently surrounded by arable farmland.

3.4.3 Where the Cable Route Corridor extends south from the Solar Array Area it is located approximately 1.1km east of Heckington at the closest point. There are a number of individual properties located immediately adjacent to the Site boundary, on Littleworth Drove and Star Fen Road where they transect the Site. Other nearby villages and hamlets to the Cable Route Corridor, not already listed above, include:

- Great Hale c. 1.1km to the west, with Little Hale and Helpringham
- beyond;
- East Heckington c. 1.2km to the north-east;
- Swineshead Bridge c. 1.86km to the east;
- Swineshead c. 2.1km to the east;
- Bicker Bar c. 1.8km to the south-east; and
- Donington c. 1.5km to the south.

3.4.4 Where the Bespoke Access Corridor extends south from the Solar Array Area it is located about 400m south of Ewerby and 2.1km west of Heckington at the closest point. There are also a small number of individual properties located adjacent to the Site boundary of the Access Route corridor, on Asgarby Road and in Boughton and Asgarby. Other villages and towns near to the Access Route Corridor include:

- Kirkby la Thorpe c. 1km to the west; and
- Sleaford c. 3km to the west.

3.5 Technical and Functional Requirements

3.5.1 It is essential for the Solar Array Area to be of an adequate size to provide for a generation capacity that will ensure the Proposed Development is viable and deliver maximum benefits, as well as accommodate a BESS which makes full use of the available grid connection capacity, and an Onsite Substation, and include enough space and suitable access to construct all the required infrastructure.

3.5.2 It is essential that the Solar Array Area must have a suitable level of irradiance, part of this being that the site topography must be suitable to maximise this.

3.5.3 It is desirable that the Solar Array Area avoids best and most versatile ('BMV') agricultural land and areas of flood risk where possible. It is also desirable for the Solar Array Area to avoid and be set away from residential, cultural heritage and other sensible receptors wherever possible. Another key consideration was the identification of willing landowners to avoid the need for large scale compulsory acquisition.

3.5.4 It is essential that the maximum length of Cable Route Corridor allows the Proposed Development to remain viable. It is essential for the Cable Route Corridor to avoid sensitive ecological and below ground heritage receptors. During the options appraisal process for the Cable Route Corridor, a separate overhead line option was also under consideration and so it was considered desirable to avoid above ground heritage and landscape receptors in designing the route for the Proposed Development.

3.5.5 The requirement for a Bespoke Access Corridor has arisen as a response to the location and requirements of the Solar Array Area but its routing similarly had a number of functional requirements. It was essential that it provided a more suitable main access route than the existing local road network and was suitable with regards to Abnormal Indivisible Load access, safety, highway quality and interactions with agricultural traffic. It was also desirable to avoid sensitive receptors wherever possible.

3.6 Site Appraisal – Solar Array Area

3.6.1 The Solar Array Area is of an adequate size to accommodate the Proposed Development and within a suitable distance of the Point of Connection.

3.6.2 The Solar Array Area predominantly comprises agricultural land of a suitable topography in arable use, divided by ditches with sparse tree cover that is limited to small woodland blocks and scattered hedgerow trees. A small reservoir is located in the south-west of the Solar Array Area. Land use within the Cable and Access Route Corridors is also predominantly agricultural.

3.6.3 The wider area around the Site is characterised by drains and dykes, typical landscape features of the fenland landscape, which are characteristic of both the Solar Array Area and the Cable Route Corridor. The low-lying fen landscape east of Great Hale, Little Hale and Helpringham comprises large and medium-scale fields divided from one another by drainage channels.

3.6.1 More information on the selection of the Solar Array area can be found within the **Site Selection Report (Appendix 2 to the Planning Statement, Document Ref. 5.5)**.

3.6.2 The following sections provide a high-level summary of the existing physical, environmental, social and cultural context of the Site where it has informed the design of the Proposed Development.

3.6.3 Taking account of the above and the assessments carried out through the pre-application process, the Solar Array Area presents a number of beneficial attributes for the siting of a solar farm, including:

- A mostly flat site comprising land with little shading;
- A suitably sized site, parts of which are distant from any residential receptors and are suitable for battery and substation development;
- Viable proximity to the Point of Connection;
- The site and wider area being of relatively low environmental sensitivity;
- Few Public Rights of Way crossing the Site; and
- Close proximity to the strategic road network.

3.6.4 Taking account of the above and the assessments carried out through the pre-application process, the Solar Array Area presents a number of potential constraints for the Proposed Development, including:

- The villages of Ewerby Thorpe and a small number of individual residences adjacent and in close proximity to the Site;
- Approximately half appears to lie within areas of flood risk, based on public mapping;
- Presence of sensitive archaeological receptors, in particular Listed Buildings located in Ewerby Thorpe and Howell;
- Presence of Best and Most Versatile agricultural land, albeit also subject to flood risk; and
- A lack of existing direct access to the strategic road network suitable for Abnormal Indivisible Loads.

3.7 Site Appraisal – Cable Route Corridor

3.7.1 The Cable Route Corridor runs primarily along agricultural land between the Solar Array Area and the A17, crossing two roads which present constraints. However, it avoids Heckington and other nearby villages, is south of identified sensitive heritage assets including a Scheduled Monument, Roman Saltern and the Anglo-Saxon trading centre and is north of a concentration of Local Wildlife Sites.

3.7.2 A full appraisal of the Cable Route Corridor can be found in **ES Appendix 3.1 Grid Connection Corridor Appraisal (Document Ref: 6.3.9)**.

3.8 Site Appraisal – Bespoke Access Corridor

3.8.1 The Bespoke Access Corridor runs primarily across agricultural land between the Solar Array Area and the Bicker Fen Substation. It also crosses over a number of roads (including the A17), a railway line and watercourses which all present constraints. Trial trenching has also identified the presence of archaeological features along the Bespoke Access Corridor.

3.8.2 A full appraisal of the Bespoke Access Corridor can be found in **ES Appendix 3.2 Bespoke Access Road Appraisal (Document Ref: 6.3.10).**

4. Design Approach

4.1.1 This Section sets out the approach that the Applicant has taken to the design of the Proposed Development and demonstrates the adoption of a good design process.

4.2 Design Objectives

4.2.1 The approach that the Applicant has taken to the design of the Proposed Development included a number of design objectives which were informed by the context within which the Proposed Development will sit, the opportunities and constraints that exist, national planning policy, NIC's Good Design Principles, and the local planning policy framework.

4.2.2 As described in Section 3 of this report, the immediate context within which much of the Site and its surrounds sit is agricultural land both in its use and appearance. It is characterised by the existing fields divided by ditches with sparse tree cover that is limited to small woodland blocks and scattered hedgerow trees.

4.2.3 The Applicant acknowledges that the approach to design should be appropriate to the context and purpose of the Proposed Development, which is to generate electricity and then export it to the national grid. This meant, following the necessary removal of Beacon Fen South land (as described in **ES Chapter 3: Alternatives & Design Evolution (Document Ref: 6.2.3)**) accepting that potentially 600MW of solar generation may not be achieved. At this early stage it was established on a preliminary engineering basis on current technologies that between 400-600MW solar generation would be achievable on the remaining land and that by maintaining progress with this delivery would remain achievable by the 2030s, supporting the overall purpose of the Proposed Development.

4.2.4 The Design Objectives were established at an early stage and are set out in **Table 4.1** below and formed the basis of questions that the project team repeatedly asked itself through the pre-application period.

Table 4.1: Design Objectives

TOPIC	DESIGN OBJECTIVES
Consultation	C1. The Applicant will consult widely, honestly and comprehensively – to allow representations to be incorporated into the Proposed Development to influence its development, where practicable and appropriate (as set out in the Statement of Community Consultation which can be found at Appendix 5 of the **Consultation Report (Document Ref: 5.1**). C2. The Applicant will ensure that at all stages of consultation, consultees will be provided with adequate information and time to provide responses which can inform the design of the Proposed Development. This includes asking consultees for their thoughts on specific aspects of the design where appropriate.

General	G1. Field boundaries will be maintained and strengthened wherever possible. G2. Existing woodland blocks and veteran trees will be avoided where possible.
Solar Array Area	SAA1. The design and layout of all infrastructure within the Solar Array Area will seek to minimise adverse impacts on landscape and visual amenity through appropriate siting. SAA2. Setbacks from existing drains and dykes will be maintained where possible, avoiding unsuitable topography. Solar panels are to be arranged and designed to maximise renewable energy production and make efficient use of land. Solar panel heights will be optimised to reduce visual impact while ensuring they are safe during flood events to ensure resilience against climate change. SAA3. The battery energy storage system and on-site substation should be co-located to allow sharing of facilities and mitigations and located away from residential receptors and areas at risk of flooding where possible. SAA4. Set-backs and other mitigations will be used to reduce visual impacts on residential areas, individual residents and other sensitive receptors as much as possible. SAA5. Design and mitigation will reduce impacts on recreation and provide take advantage of opportunities for enhancement where possible. SAA6. Fences will be designed to provide adequate security while keeping landscape and visual impact to a minimum through measures such as keeping them behind hedgerows where possible. SAA7. Infrastructure which generates noise will be located and mitigation designed to reduce impacts on sensitive receptors. SAA8. Existing tracks will be used within and to the Solar Array Area wherever possible. SAA9. Cabling will be underground wherever possible to reduce visual impact. SAA10. New access and cabling will make use of existing gaps in vegetation wherever possible.
Cable Route Corridor	CRC1. The Cable Route Corridor will avoid constrained areas where possible and provide mitigation where required. CRC2. The Cable Route Corridor and its construction accesses will make use of existing gaps in hedgerows and vegetation wherever possible. CRC3. Any Public Rights of Way crossed by the Cable Route Corridor will be retained and impacts kept to a minimum. CRC4. The length of the Cable Route Corridor will be reduced, and the use of overhead lines will be

	minimised for visual impact reasons (it may be used to allow for unknown ground conditions along the route or avoiding long sections of horizontal direct drilling). In the event that overhead lines are used to provide a connection, visual impacts will be minimised, through adherence to the Holford Rules (with rules 3 – choose a direct line - and 6 – in flat country keep away from existing smaller overhead lines - being of particular pertinence to this locality and scale). CRC5. Temporary access tracks and construction compounds to be used in relation to the construction of the Cable Route Corridor will be set away from sensitive receptors wherever possible.
Works to Bicker Fen substation	BFSW1. The works to Bicker Fen substation will be designed by NGET and the design of the Proposed Development will ensure it fits within the project and allow appropriate flexibility. BFSW2. The design of works to Bicker Fen substation will seek to minimise adverse impacts.
Bespoke Access Road	BAR1. The design of the Bespoke Access Road and associated construction methods will seek to reduce impacts on areas of higher agricultural land classification based on available data. BAR2. The Bespoke Access Road will avoid constrained areas where possible and provide mitigations where required. BAR3. The Bespoke Access Road will be of a width and with turning radii suitable to provide suitable access for Abnormal Indivisible Loads. BAR4. The Bespoke Access Road will make use of existing gaps in vegetation where possible. BAR5. The Bespoke Access will be positioned to keep visual impact to a minimum. BAR6. Landscaping will be designed where possible to protect the open nature of the area. BAR7. Any Public Rights of Way crossed by the Bespoke Access Road will be retained and impacts kept to a minimum. BAR8. Construction compounds to be used in relation to the construction of the Bespoke Access Road will be set away from sensitive receptors wherever possible.
Landscaping and Biodiversity Mitigations and Enhancements	LBME1. Existing landscaping and biodiversity will be retained wherever possible, and any impacts will be minimised. LBME2. Proposals for landscaping and biodiversity mitigations and enhancements will be developed with respect to the character of the Site and the wider local area. LBME3. Proposals for landscaping and biodiversity mitigations will make use of locally native species where possible.

	LBME4. Proposals for landscape and biodiversity mitigations and enhancements will take advantage of opportunities to achieve a high Biodiversity Net Gain.
Flexibility	F1. Flexibility will be retained within the design where possible, in order to safeguard and facilitate the use of the latest specifications of renewable technologies and environmental mitigations in the detailed design of the Proposed Development.

4.2.5 Adherence to these Design Objectives allowed a good design process to be followed during the pre-application period for the Proposed Development. The process was iterative and allowed the Applicant to refine and evolve the design during a sequence of internal workshops, options appraisals (for the Cable Route Corridor and Bespoke Access Road), near neighbour engagement and consultation on relevant options (including in relation to mitigations and the Bespoke Access Road). Regular meetings took place between the designers and other members of the project team and reviews of the design was undertaken at key stages as new information became available, for example, following consultations. Further information on this can be found within the appendices of the **Consultation Report (Document Ref: 5.1)**, in particular within the consultation boards and other materials particularly in Appendix 4 (Early Non-Statutory Consultation), Appendix 6 (Statutory Consultation under Section 47) and Appendix 7 (Statutory Consultation under Section 42).

4.2.6 These Design Objectives fed into the pre-application period at a time prior to the latest suite of NPSs and prior to the requirement to draft a DAD. Nevertheless, it is considered that the design approach was successful and was done in an appropriate way as evidenced throughout this document.

4.3 Flexibility

4.3.1 It is important to recognise that solar panels, BESSs and associated technologies are constantly advancing in terms of their efficiency and durability. It is therefore not possible to know the specifics of the infrastructure that will be installed on Site in the event that the Proposed Development is granted consent and delivered, and it is therefore necessary, proportionate, and supported by national policy to allow for a degree of flexibility in the design and layout of the Proposed Development, within the parameters of the Application and the Environmental Impact Assessment ('EIA') undertaken for the Application.

4.3.2 A key reason for needing to incorporate flexibility within the Proposed Development at the consenting stage relates to the appointment of a contractor. This would not take place until after the Secretary of State has granted a DCO and the Applicant has made a final investment decision to proceed with the Proposed Development. Following the award of the construction contract(s), the appointed contractor would then need to carry out a number of detailed design studies in order to inform the final design of the Proposed Development to make most effective use of available technologies and optimise the design and layout. At this stage of the process, it is not therefore possible to finalise the detailed design of the Proposed Development.

4.3.3 In order to provide sufficient flexibility and ensure a robust EIA bas been prepared in accordance with the relevant regulations the Applicant has adopted the principles of the 'Rochdale Envelope' approach and assessed maximum (and where appropriate minimum) design parameters for the elements of the Proposed Development where flexibility needs to be retained at the consenting stage. These parameters include the limits within which the various elements of the Proposed Development can take place (as defined by the **Works Plan Document Ref: 2.4)** in addition to maximum dimensions for the main buildings and structures.

4.3.4 More information on how the worst-case scenario has been used in assessing the effects of the Proposed Development can be found in **ES Chapter 4 Scope and Methodology (Document Ref: 6.2.4)**.

5. Design Evolution

5.1.1 This section of the document sets out how the design of the Proposed Development has evolved through the pre-application process, including through consultation.

5.2 Design Development

5.2.1 Following identification of the initial site which featured two viable segments known as Beacon Fen North and Beacon Fen South, the latter site was removed due to the potential conflict with Anglian Water's proposed Lincolnshire Reservoir project. Notwithstanding the removal of Beacon Fen South site, the Proposed Development was considered to remain viable as Beacon Fen North site was assessed as being capable of producing enough renewable energy and crucially to remain deliverable by the 2030s.

5.2.2 Following the decision to remove the Beacon Fen South site from the Proposed Development, the Cable Route Corridor was reevaluated against the Design Objectives as no longer connecting to Beacon Fen South allowed a shorter route to be designed. An options appraisal was undertaken to identify and review the environmental constraints associated with the Cable Route Corridor for the Proposed Development and compare it with alternatives **(ES Appendix 3.1: Cable Route Corridor Appraisal (Document Ref: 6.3.9)**. Design Objectives CRC1 and CRC4 were of particular relevance for this appraisal. The appraisal ensured that the chosen corridor taken forward as part of the Proposed Development minimises potential environmental effects as far as possible.

Layout

5.2.3 The layout of the Solar Array Area evolved through systematically incorporating the buffers and offsets required for environmentally sensitive features such as hedgerows, waterbodies and drainage, woodland, existing habitats, residential properties and footpaths, in accordance with Design Objectives SAA1, SAA2, SAA4, SAA7 G1, G2 and LBME1. The Proposed Development has been carefully designed to avoid or minimise adverse effects in relation to these features. Furthermore, the layout of the Proposed Development evolved through detailed modelling of surrounding watercourses and associated flood levels to ensure that more sensitive electrical equipment was sited away from areas at higher risk of flooding in line with SAA2. Further information on this can be found in the **Flood Risk Assessment (Document Ref: 6.3.8)**.

5.2.4 The proposed layout was designed having regard to ecological, archaeological and other constraints, and these buffers are referred to as 'embedded mitigation' because they form an integral part of the design of the Proposed Development. These are set out in **ES Appendix 2.3: Embedded Mitigation (Document Ref: 6.3.6)** and included but are not limited to:

- Vegetation buffers, including minimum stand-offs of 15m from Ancient Woodland and other retained woodland and tree groups, 2m from hedgerows without trees and root protection areas where appropriate in line with G2, LBME1 and LBME2;

- Buffers of at least 9m around all ditches, expect where crossings are required in line with SAA2; and
- Buffers of 30m around all known badger setts in line with LBME1 and LBME2.

Panel Heights

5.2.5 Within the Preliminary Environmental Impact Report ('PEIR') a worst-case panel height of 4.5m was considered. Flood modelling has since been undertaken in order to identify the minimum clearance required below the panels, which in turn has been used to identify the maximum panel heights for consideration within this ES. Furthermore, NKDC requested further refinement of the panel heights.

5.2.6 This has allowed for a reduction in panel heights, reducing the potential visual effects of the Solar Array Area. The height of the panels is now up to 3.9m in fields to the east and 3.5m in fields to the west, south and an isolated field in the north. Flexibility has been maintained in accordance with Design Objectives SAA2 and F1.

5.2.7 Further information is provided in **ES Chapter 11 Water Resources & Flood Risk (Document Ref: 6.2.11)**.

Inverters

5.2.8 Given the advancing nature of renewable energy technology, the Applicant has retained flexibility in relation to the specific type of inverter to be incorporated into the Proposed Development. The two types of inverters that have been considered are String or Central, as discussed in detail in **ES Chapter 2 Proposed Development (Document Ref: 6.2.2)**.

5.2.9 In summary, Central inverters are larger, however, fewer of them would likely be required across the site.

5.2.10 If Central inverters are progressed, there are two options for these: Outdoor or Indoor (enclosed) equipment. The size of both options is similar however they will appear visually different (i.e. Outdoor equipment will be visible, whilst Indoor equipment would be screened by the enclosure).

5.2.11 Flexibility has been maintained in accordance with Design Objective F1.

Transformers

5.2.12 As mentioned above, the Applicant has retained flexibility on the type of transformer that will form part of the Proposed Development due to advancing technology.

5.2.13 There are two options for the transformers that have been considered: Outdoor or Indoor (enclosed) equipment.

5.2.14 The size of both options is similar however they will appear visually different (i.e. Outdoor equipment will be visible, whilst Indoor equipment would be screened by the enclosure).

5.2.15 Flexibility has been maintained in accordance with Design Objective F1.

Cable Route Corridor

5.2.16 The initial identification and selection of an existing Point of Connection to extend, and the incorporation of NGET functional requirements along with planting screening, have all contributed to good design for the extension of the Bicker fen 400kV Substation. In doing so, the Proposed Development has reduced the impacts associated with the Point of Connection itself and reduced the potential to impact constrained areas in accordance with Design Principles CRC1 and BSFW2.

5.2.17 The Applicant has undertaken numerous rounds of review in order to identify the most suitable Cable Route, and form of cabling (underground or overhead), for the Proposed Development.

5.2.18 Ahead of Scoping, the Applicant undertook constraints analysis followed potential route identification, through the reviewing of environmental constraints, planning land use and access, in accordance with Design Objectives CRC1 and CRC4.

5.2.19 Following the removal of the Beacon Fen South site, the Cable Route Corridor was revisited to identify a more direct route and the additional design objectives set out. Three options were considered with two discounted due to proximity to sensitive archaeological receptors, Local Wildlife Sites and residential receptors. The chosen route was also the shortest route, therefore reducing the scale and geographical extent of potential environmental effect, as well as the required land take.

5.2.20 Following submission of the Scoping Report, further refinement took place. Environmental, land and planning constraints were mapped within the Cable Route Search Area and reviewed by the Applicant's project design team, in order to identify potential cable routes within the Search Area. This included consideration of which routes would avoid key environmental constraints including Local Wildlife Sites, archaeological records and other heritage receptors, alongside other matters such as consideration of railway crossings, access requirements and other planning proposals. The output of this fed into the PEIR.

5.2.21 During this stage it was also determined that the cable route would be underground, as previously the Applicant had also been considering the potential for an overhead line connection. This goes above and beyond Design Objective CRC4 which simply commits to use of overhead lines being kept to a minimum. The Proposed Development has committed to all cabling within the Cable Route Corridor being located wholly underground.

5.2.22 Further information is contained within **ES Chapter 3: Alternative & Design Evolution (Document Ref: 6.2.4)** and the **ES Appendix 3.1: Grid Connection Corridor Appraisal (Document Ref: 6.3.10)**.

5.3 Design through Consultation

5.3.1 In addition to the abovementioned design evolution which was undertaken with careful consultation with statutory consultees and the local community, a number of changes were made to the design as a direct or indirect result of consultee feedback. Details of this are set out in this section.

Residential Stand-Offs

5.3.2 The Applicant has carried out extensive engagement with local residents including attending the homes of a number of residents that border the Site, in line with Design Objectives C1 and C2. The Applicant has worked with these near neighbours to better understand their concerns and re-design residential setbacks and taking aboard their preferences with regard to mitigation. This includes the Applicant sharing photographs from the residences, sharing them with the project team, and accommodating the residents wherever possible.

5.3.3 For example, with regards to Gashes Barn, an initial meeting was held to discuss the launch of the Proposed Development in May 2023. A second meeting featuring a discussion on buffers was held in November 2023, following by a third meeting in February 2024.

Permissive Path

5.3.4 Following consultation responses from statutory consultees including NKDC, LCC and Natural England, a permissive footpath is now proposed through the Solar Array Area in order to connect existing Public Rights of Way which currently do not connect.

5.3.5 The Applicant has provided during meetings with NKDC and LCC a possible indicative routing for a permissive path which will achieve these objectives, in line with Design Objective SAA5. The **Streets, Rights of Way and Access Plans (Document Ref: 2.5)** set out the points which will be connected but the final route and layout will be designed following the detailed design of the Proposed Development and secured by requirement as set out in the **Draft DCO (Document Ref: 3.1)**.

Battery Safety

5.3.6 During discussions with Lincolnshire Fire and Rescue Service, the Applicant reviewed the design of the Proposed Development to ensure it complied with the latest guidance. This involved measures to reduce risk of fire and risk of it spreading, and ensuring the design provided suitable access and water supply for firefighting should it be required. Further information can be found in the **Outline Battery Safety Management Plan (Document Re: 7.2)**. Delivery of a detailed Battery Safety Management Plan prior to commencing construction of the BESS, secured by a Requirement in Schedule 2 to the **Draft DCO (Document Ref: 3.1).**

Biodiversity Net Gain and Ecology

5.3.7 During statutory consultation, Natural England advised that due to the scale of the development site, there is the unique opportunity to enhance the connectivity of habitats in and around the site and continue to contribute towards the development of the Nature Recovery Network on a landscape scale. The Environment Agency also submitted a number of comments with regards to achieving a Biodiversity Net Gain and Lincolnshire Wildlife Trust raised concerns relating to ground-nesting birds, in particular skylark.

5.3.8 The Applicant has responded through the proposed inclusion of appropriate buffers and planting / habitat management onsite and within the buffer areas in accordance with Design Objectives LBME1, LBME2, LBME3 and LBME4. It should be noted, however, that the final species mix will be determined at the detailed design stage and specified within the Landscape Environmental

Management Plan (LEMP), which must be substantially in accordance with the **Outline LEMP (Document Ref: 6.3.19)**, as secured by a Requirement in Schedule 2 to the **Draft DCO (Document Ref: 3.1).**

Ancient Veteran Trees

5.3.9 During statutory consultation, Natural England highlighted that ancient and veteran trees should be considered in line with Natural England's and the Forestry Commission's standard advice and recommended that where any ancient/veteran trees or ancient woodland are in proximity to construction works, in particular any construction compounds, measures such as dust suppression should be considered to avoid any potential smothering and/or other indirect effects to this irreplaceable habitat. A small number of ancient/veteran trees were then found on Site during the arboriculture impact assessment. These trees are all due to be retained post development in line with Design Objective LBME1. Further details including the locations of trees, root protection areas and precautionary mitigation are outlined within **Arboricultural Impact Assessment (Document Ref: 6.3.18)**, with relevant mitigation measures being secured through the **Outline LEMP (Document Ref: 6.3.19)**.

Cultural Heritage

5.3.10 Historic England requested that the Applicant engage with the County Archaeologist with regards to the geophysical survey programme, trial trenching and associated archaeological mitigation and minimisation of impacts through layout and design detailing. The design of the Proposed development has evolved to reflect archaeology and cultural heritage (e.g. via the inclusion of standoffs / buffers and the refinement of both the Bespoke Access Corridor and the Cable Route Corridor).

5.3.11 Geophysical survey has been undertaken across the Site including the Solar Array Area, Cable Route Corridor and the Bespoke Access Corridor. Trial trenching approach was for most of the Solar Array Area a sample coverage up to 2%. However, the Applicant has also undertaken multilayered non-intrusive surveys across most of the Site and this will be reflected within a targeted landscape approach to any remaining evaluation and the mitigation strategy in consultation with LCC. A requirement in Schedule 2 to the **Draft DCO (Document Ref: 3.1)** secures that no part of the Proposed Development may commence until a written scheme of archaeological investigation (which must accord with the **Archaeological Mitigation Strategy (Document Ref: 6.3 ES Vol.2, 6.3.74)**.) for that part has been submitted to and approved by the relevant planning authority.

5.3.12 Further information can be found in **ES Chapter 8: Cultural Heritage (Document Ref: 6.2.8)**.

6. Access Arrangements

6.1.1 This section of the DAAD considers the access arrangements relevant to the construction, operational/maintenance and decommissioning stages of the Proposed Development. It has specific focus on the Bespoke Access Road.

6.2 Access to Solar Array Area

6.2.1 The Proposed Development will include the construction of a new access road between the A17 and the Solar Array Area which will be the primary means of access to facilitate all phases of the Proposed Development (construction, operation/maintenance and decommissioning) known as the Bespoke Access Road.

6.2.2 The Applicant undertook a number of rounds of review in order to identify the most suitable access route for the Solar Array Area. This began with a desktop feasibility study on the potential construction traffic access routes within the existing highway to access the Proposed Development. It was found that the existing highway network was unsuitable for the delivery of larger infrastructure and would require significant improvement work and mitigation measures which were likely to cause disruption for regular road users.

6.2.3 Having established the need to create a bespoke access route, the Applicant undertook a number of reviews and assessments to identify and consider bespoke access routes. A number of environmental constraints were considered including ecology, archaeology, air quality, noise, soil and ground conditions, flood risk and water resources. These reviews and assessments identified the Bespoke Access Road as the preferred access.

6.2.4 In order to determine whether the Bespoke Access Road would be required during operation in addition to construction, a review was undertaken involving consideration of the rate at which equipment would potentially need replacing during the operational lifetime of the Proposed Development.

6.2.5 Part of the review included examining the types of infrastructure currently available and the associated failure rates of said infrastructure, and how the Site could be accessed for its replacement. It was determined that there was a reasonable chance that one or more of the transformers would need replacing at some point during the operation. As this could theoretically happen at any time without warning, the Applicant took the decision that the Bespoke Access Road would remain in situ for operation so that should any replacement be required it could be undertaken promptly to allow the Proposed Development to continue providing power to the grid.

6.2.6 Following this, the chosen Bespoke Access Road was revisited and re-assessed to ensure it was still the preferred option, before the corridor was narrowed, largely in response to archaeological work along the corridor comprising geophysical surveys and trial trenching. The refinement also considered the location of veteran trees and hedgerows and sought to avoid them were possible.

6.2.7 Further information is contained within **ES Chapter 3: Alternative & Design Evolution (Document Ref: 6.2.3)** and **ES Appendix 3.2: Bespoke Access Road Appraisal (Document Ref: 6.3.10)**.

6.2.8 Access directly from the A17 during the construction phase will comprise a left-in/left-out arrangement. It is generally accepted and understood that there is a high incidence of collisions associated with right-turning vehicles on high-speed roads. The proposed left-in/left-out protocol will ensure access is as safe as practicable and is agreed with LCC.

6.2.9 The entrance to the Bespoke Access Road will be formed from the existing layby to the south-west of Asgarby, which is proposed to be closed. Given the availability of other layby facilities within relatively close proximity, no replacement layby facilities are proposed during the closure.

6.2.10 The Bespoke Access Road will interact with Asgarby Road / Heckington Road, with priority given to Asgarby Road, and turning manoeuvres between the two not permitted.

6.2.11 In the wider area, junction improvements may be required, or at passing places and haul road crossing points of the public highway, as well as localised widening to facilitate Abnormal Indivisible Load access. A priority T-junction arrangement within an existing layby on the A17 is proposed as part of the Bespoke Access Road.

6.2.12 The Bespoke Access Road will be constructed in advance of and to facilitate the material construction of the development within the Solar Array Area.

6.2.13 The road will likely be the last aspect component of the Proposed Development to be removed as it will be used to facilitate decommissioning of the Solar Array Area. Whilst it is assumed for this assessment that the road will be removed, it is possible that engagement with the landowners at that time will establish a preference for it to be retained. Optionality has been deliberately retained in the Application to facilitate such a scenario. For the purposes of the **Environmental Statement (Document Ref: 6.1 – 6.4)**, (unless otherwise stated in the specific chapters) each topic has assumed the removal of the road on the basis that this will, at the time of decommissioning, have a greater potential impact than retention, so allowing for a conservative assessment of the potential significant effects.

6.2.14 There will be no permanent lighting installed, and access will be controlled through gates at all stages.

6.2.15 Reinstatement planting around the Bespoke Access Road perimeter to provide visual amenity, reduce landscape impacts, and provide net gains for biodiversity.

6.2.16 There is an access to the north-east corner of the Solar Array Area from Ferry Lane. This is not a formal access for construction of the Solar Array Area, rather it will be required for a small number of vehicles, to facilitate construction of pedestrian footbridge where footpath Ewer/12/1 crosses the Midfodder Dike.

6.2.17 Further information is contained within **ES Appendix 9.1: Transport Assessment (Document Ref: 6.3, ES Vol. 2, 6.3.76)** and **ES Appendix 9.3: Outline Construction Traffic Management Plan ('OCTMP') (Document Ref: 6.3, ES Vol. 2, 6.79)**, a full version of which will be secured by Requirement in Schedule 2 of the **Draft DCO (Document Ref: 3.1).**

Emergency and Operational Access to Solar Array Area

6.2.18 During the operational phase, the Applicant anticipates up to six operational staff on site at the Solar Array Area at any time. Due to the remoteness of the Solar Array Area to significant public transport infrastructure or large population centres, it is likely that most staff travel to/from the Solar Array Area by car. The OCTMP includes a requirement for construction worker travel plan to be included as part of the full version.

6.2.19 Given a permanent presence of up to six staff members over three shifts, vehicle trips are not expected to exceed 36 two-way trips per day. This level of use remains negligible in relation to background traffic.

6.2.20 Three secondary access points will be provided to facilitate emergency and operational vehicular access to the Solar Array Area as follows:

- Halfpenny Toll Lane near Catchwater Drain, along the northern boundary of the Site (for emergency and operational access);
- Halfpenny Toll Lane, approximately 60m east of the junction with Thorpe Road (for operational access only); and
- Howell Fen Drove (for operational access only).

6.2.21 It is anticipated that operational accesses will generally accommodate light vehicle traffic only. However, if single HGVs need to access the site for maintenance reasons, it may be possible to utilise local roads and the operational accesses rather than the bespoke access road, with no material impact on local traffic.

6.2.22 As mentioned above, the Bespoke Access Road is intended to be retained through the operation of the Proposed Development for use in specific circumstances.

6.2.23 The retention of the Bespoke Access Road during the operational phase of the development, while intended for the maintenance of the operational development, could be made available to the Fire Service (e.g. keys or other controls to gates) to allow usage by Sleaford based crews to reduce distance travelled on rural roads.

6.2.24 The selection and design of the Bespoke Access Road is in accordance with Design Objectives BAR2, BAR3 and BAR5.

6.2.25 Further information is contained within **ES Appendix 9.1: Transport Assessment (Document Ref: 6.3.76)**.

6.3 Access to Cable Route Corridor

6.3.1 During construction, temporary construction compounds will be required every 1-3 km approximately, as well as temporary roadways, to enable access to all land. It is anticipated that there will be 6 main compounds that will be distributed proportionately at approximately equal distances along the Cable Route to facilitate proper construction management. Smaller temporary compounds may also be located anywhere within the final working area.

6.3.2 Access to these compounds is proposed as follows:

- Compound 1: Access from the Energy Park;

- Compound 2: Access from A17;
- Compound 3: Access from Carterplot Road;
- Compound 4: Access from Great Hale Drove (East);
- Compound 5: Access from A17/Triton Knoll Substation Access;
- Compound 6: Access from A17/Triton Knoll Substation Access.

6.3.3 The reuse of existing tracks where possible is in accordance with Design Objective SAA8.

6.3.4 Further information is contained within **ES Appendix 9.1: Transport Assessment (Document Ref: 6.3.76)**.

6.4 Access to the Bespoke Access Road

6.4.1 The Bespoke Access Road will be constructed using existing accesses from the A17. The construction of the proposed Bespoke Access Road is anticipated to take 6 to 12 months. The Bespoke Access Road will become operational in advance of the material construction phase of the Solar Array Area, although site establishment activities defined as "permitted preliminary works" in the **Draft DCO (Document Ref: 3.1)** may be undertaken in conjunction with construction of the Bespoke Access Road.

6.5 Access to Bicker Fen National Grid Substation

6.5.1 Access to the Bicker Fen National Grid Substation from the A17 will be via Triton Knoll Substation Access Road, Bicker Drove, Doubletwelves Drove and Vicarage Drove. Cowbridge Road and routes through Bicker village will not be used by substation construction traffic except during an emergency.

6.5.2 It is not expected that the substation upgrades will lead to a material change in operational traffic accessing the substation. Existing access routes from the A17 via Bicker and Cowbridge Road will continue to be available for this purpose.

6.5.3 The above is considered to ensure that the Bicker Fen Substation Works, which will be undertaken by NGET, are able to fit within the assessed envelope of the Proposed Development while allowing suitable flexibility, in accordance with Design Objective BSFW1.

7. Setting the Design Vision and the Outline Design Principles

7.1.1 This section of the document sets out the Applicant's Vision and Outline Design Principles for the detailed design of the Proposed Development, and how it will be secured within the **Draft DCO (Document Ref: 3.1)**.

7.2 Vision

7.2.1 The Applicant's Vision for the Proposed Development is to develop a solar farm that:

- During its construction respects the local environment and minimises changes to people's day to day lives in the local area and adopts routeing and siting of construction facilities that minimise environmental harms.
- Is sized, designed and operated to make the maximum contribution to the production of clean, renewable energy, while delivering substantial Biodiversity Net Gain, delivering priority habitats, attractive boundary treatments around the Solar Array Area, and relevant and useable recreational provision and interpretation for local communities over the 40-year course of its operation.

7.2.2 This Vision is secured by the Outline Design Principles, which are set out in **Appendix 1** of this document, based on the Design Objectives set out in **Section 4** of this report and the Design Parameters used within the **Environmental Statement (Document Ref: 6.1 – 6.4)**.

7.3 Securing Design

7.3.1 Where flexibility is being sought in the design of a development, as set out in **Section 4** of this report, it is important to ensure that appropriate mechanisms are in place to provide certainty to the local community, the local authorities and other relevant bodies that its detailed design will be in accordance with the design parameters upon which the EIA has been based.

7.3.2 In addition to the design secured by the Outline Design Principles at Appendix 1 of this document, the Applicant has drafted the **Draft DCO (Document Ref: 3.1)** such that the development it authorises (as described in Schedule 1 to the DCO) must be carried out within the limits shown upon the **Works Plan (Document Ref: 2.4)** and the maximum design parameters set out in the **Environmental Statement (Document Ref: 6.1 – 6.4)**. The DCO therefore includes number of 'articles' and 'requirements' which secure the detailed design of the Proposed Development.

7.3.3 The details secured by the requirements must be submitted to the relevant LPAs for approval, as set out in Schedule 2, to the **Draft DCO (Document Ref: 3.1)**. The articles and requirements are summarised in **Table 7.1**.

Table 7.1: DCO Articles and Requirements relating to Detailed Design

ARTICLE OR REQUIREMENT	TITLE	DESCRIPTION
Article 3 and Schedule 1 (authorised development)	Development consent etc. granted by this Order	Requires the Proposed Development (as described in Schedule 1) to be constructed within the limits defined on the **Works Plan (Document Ref: 2.4)**.
Article 41 and Schedule 12 (documents and plans to be certified)	Certification of plans, etc.	Requires the undertaker to certify certain plans and documents (e.g., the **Works Plan (Document Ref: 2.4)** and the **Environmental Statement (Document Ref: 6.1 – 6.4)**) and in effect ensures that the Proposed Development must be carried out in accordance with these documents.
Requirement 5	Detailed design	Requires submission and approval of details of all parts of the authorised development, and that they comply with the **Works Plan (Document Ref: 2.4)** and Outline Design Principles.
Requirement 6	Battery safety management	Requires submission, approval, implementation and maintenance of a battery safety management plan, detailing measures to facilitate safety during construction, operation and decommissioning of Work No. 2. This plan must be substantially in accordance with the **Outline Battery Safety Management Plan (Document Ref. 7.2)**.
Requirement 7	Landscape and ecological management plan	Requires the submission, approval, implementation and maintenance of a landscape and ecological management plan. This plan must be substantially in accordance with the **Outline Landscape and Ecological Management Plan (Document Ref: 6.3, ES Vol. 2, 6.3.19)**.
Requirement 8	Biodiversity net gain	Requires the submission, approval, implementation and maintenance of a biodiversity

		net gain strategy. This strategy must be substantially in accordance with the **Outline Landscape and Ecological Management Plan (Document Ref: 6.3, ES Vol. 2, 6.3.19)**.
Requirement 9	Fencing and other means of enclosure	Requires submission and approval of all temporary and permanent fencing and other means of enclosure.
Requirement 10	Surface and foul water drainage	Requires submission, approval, implementation and maintenance of details of all surface water drainage and (if any) foul water drainage systems. These details must be substantially in accordance with the outline drainage strategy, which is contained within Section 8 of the **Flood Risk Assessment (Document Ref: 6.3 ES Vol. 2, 6.3.81)**.
Requirement 11	Archaeology	Requires submission, approval and implementation of a written scheme of archaeological investigation, and any archaeological works be carried out in accordance with approved scheme. The written scheme of investigation must accord with the **Archaeological Mitigation Strategy (Document Ref: 6.3 ES Vol. 2, 6.3.74)**.
Requirement 12	Construction environmental management plan	Requires submission, approval, implementation and maintenance of a construction environmental management plan. The plan must be substantially in accordance with the **Outline Construction Environmental Management Plan (Document Ref: 6.3 ES Vol. 2, 6.3.7)**.
Requirement 13	Construction traffic management plan	Requires submission, approval, implementation and maintenance of a construction traffic management plan. The plan must be substantially in

		accordance with the **Outline Construction Traffic Management Plan (Document Ref: 6.3 ES Vol. 2, 6.3.78)**.
Requirement 14	Operational noise	Requires submission, approval, implementation and maintenance of an operational noise assessment containing details of how the design of the development within the Solar Array Area has incorporated mitigation to ensure the operational noise rating levels as set out in **Chapter 10 Noise and Vibration (Document Ref: 6.2 ES Vol. 1, 6.2.10)** will be complied with.
Requirement 15	Permissive path	Secures the delivery of the permissive path extending PRoW Ewer/12/1 between points PP 1/01 and PP 4/01 on the **Streets, Rights of Way and Access Plans (Document Ref: 2.5)**. The permissive path must be open to the public one year following the date of final commissioning of Work No. 1 and maintained for the duration of the operation of the Proposed Development.
Requirement 16	Soils management	Requires submission, approval, implementation and maintenance of soil management plans for the construction, operation and decommissioning stages of the Proposed Development. The detailed plans must be substantially in accordance with the **Outline Soil Management Plan (Document Ref: 6.3 ES Vol. 2, 6.3.95)**.
Requirement 17	Skills, supply chain and employment	Requires submission, approval, implementation and maintenance of a skills, supply chain and employment plan. The plan must identify opportunities for individuals and businesses to access employment and supply chain opportunities associated with

		that part of the Proposed Development and the means for publicising such opportunities and must be substantially in accordance with **Outline Skills, Supply Chain, Employment Plan (Document Ref: 6.3 ES Vol. 2, 6.3.98)**.
Requirement 18	Decommissioning and restoration	Secures that decommissioning of Work Nos. 1, 2 and 3 the Proposed Development must commence no later than 40 years following the date of final commissioning. Secures the submission, approval, implementation and maintenance of a decommissioning environmental management plan which must be substantially in accordance with the **Outline Decommissioning Environmental Management Plan (Document Ref: 6.3 ES Vol. 2, 6.3.8)**.

7.3.4 The above ensures that the detailed design of the Proposed Development is controlled and secured.

8. Conclusions

8.1.1 This DAAD sets out how the Applicant has approached design and access considerations throughout the pre-application design iterations of the Proposed Development, and how established design principles will be followed during the detailed design process following DCO consent.

8.1.2 The document explains how the Site's context, wider setting, relevant guidance, including requirements for 'good design' as set out in the relevant NPSs, and Design Objectives has been taken into account, and will continue to be taken into account, throughout the design of the Proposed Development.

8.1.3 In order to ensure viability, optimising production of renewable energy, for which there is a strong and well-established need (as set out in the **Planning Statement (Document Ref: 5.5)**), has been a key consideration throughout, starting with the Design Objectives that have fed into the design throughout. The Applicant has worked within the context of the Site and the surrounding area to create a design which keeps impacts, including on the local community, to a minimum, while maximising benefits, such as with regards to biodiversity.

8.1.4 This document also sets out how the design of the Proposed Development has evolved throughout the pre-application period, including as a result of technical considerations, survey work and consultation with the local community, local planning authorities and statutory undertakers.

8.1.5 The good design process has been iterative and has allowed the Applicant to refine and evolve the design through a range of methods during a sequence of internal workshops, options appraisals (for the Cable Route Corridor and Bespoke Access Road), near neighbour engagement and consultation on relevant options (including in relation to mitigation and the Bespoke Access Road).

8.1.6 The dedicated access arrangements to the Solar Array Area, through the delivery of the Bespoke Access Road, provide a comprehensive means for larger vehicles to access the Site while also improving amenity and wellbeing in local settlements by reducing the impact of traffic associated with the Proposed Development on the local road network.

8.1.7 While flexibility has been sought in the design of the Proposed Development, the Applicant has defined design parameters upon which to base the EIA to ensure that the likely significant effects of the Proposed Development have been robustly assessed. The Applicant has also included appropriate articles and requirements within the **Draft DCO (Document Ref: 3.1)** to ensure that the detailed design of the Proposed Development is controlled and secured.

8.1.8 This flexibility will, among other things, allow the Applicant to optimise the final design of the Site to make best of the latest technologies, while the vision for the design of the Proposed Development is secured by the Outline Design Principles.

8.1.9 In light of the above, it is considered that the Proposed Development represents 'good design' for the purposes of renewable energy infrastructure

and policy set out in the relevant NPSs, the local context and other relevant planning policy.

Appendices

Appendix 1 – Outline Design Principles

Work Number and short description (for full wording see Draft DCO, Document Ref: 3.1)	ES Design Parameters	Additional Design Principles
Work No. 1 – a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts	• Maximum height of arrays will be 3.9m above ground level in fields in the east and 3.5m above ground level in fields towards the west, south and an isolated field in the north. See **ES Figure 2.4: Panel Heights (Document Ref:6.4 ES Vol.3, 6.4.5)** for distribution across the Solar Array Area. • The maximum panel dimensions will be 2.5m long and 1.5m wide. • The panels will be fixed / static, facing due south and tilt angled 10° to 45° from horizontal. • Module frame to be built from anodised aluminium or steel. • Tables will be supported by galvanized steel poles, driven approximately 1m to 2.5m into the ground. ~~• The following minimum offset / buffer from existing vegetation boundaries will be maintained.~~ • MV Transformers will have an outdoor footprint of up to 6m x 3.5m and height of up to 3.5m or be installed within a container with a footprint of up to 7m x 43.5m and height of up to 3.5m. • Inverters will be String or Central. ~~• A single string inverter unit could be utilised for up to every 32 (array) strings, with the string inverters small enough to be mounted underneath the modules.~~ • If string inverters are used, a single string inverter unit will be utilised for up to every 32 (array) strings, with the string inverters small enough to be mounted underneath the modules. • If Central Inverters are used, they will require their own electrical cabinet enclosures and be located at regular intervals amongst the PV arrays, occupying an area (anticipated to be approximately 12m x 3m and up to 3.5m in height) that will be reliant upon the intervals. The two options for central inverters are as follows: ○ **Outdoor equipment**: Placing the equipment (i.e., inverter, transformer and switchgear) outdoors and independent from each other, with an approximate footprint of up to 480m^2 and a height of up to 3.5m. ○ **Indoor (i.e. enclosed) equipment**: Placing the equipment within a purpose built enclosure similar to a 40-foot ISO High Cube Container, with an approximate footprint of up to 480 m^2 and a maximum height of up to 3.5m.	• The PV panels will be dark blue, grey or black in colour. • The PV panels will have an anti-reflective coating (ARC). • Plant will be externally finished in a colour in keeping with the prevailing surrounding environment, often with a green painted finish. • To protect the historic character of the landscape, the inclusion of additional hedgerows within Solar Array Area will be considered and included where this is necessary for screening purposes. • Waterbodies will be retained. • Sustainable Drainage Solutions (SuDS) will be used to manage and control the movement of water around the Proposed Development and restrict discharges from the Site to greenfield runoff rates. A surface water management plan will be designed in accordance with relevant national and local policies and guidance and must be substantially in accordance with the outline drainage strategy, which is contained within Section 8 of the **Flood Risk Assessment (Document Ref: 6.3 ES Vol.2, 6.3.81)**. • Modules will have heat-resistant PV cells and module materials designed to withstand short peaks of very high temperature. • All buildings and infrastructure will incorporate flood resilient design and construction principles where practical.
Work No. 2 — a battery energy storage system compound and associated works (including fire safety infrastructure)	• Batteries to be placed within individual enclosures, arranged regularly within a compound with vehicular access available to each unit. Final number dependent upon power capacity and duration of energy storage. • BESS container dimensions: up to 8m x 3m, with a height of up to 4.5m. • Total size and distribution of BESS across the Site will be reliant on grid conditions at the time of construction design. • BESS will be AC coupled single compound.	• The general principles of the layout will be similar to the **Illustrative Layout Plan of Battery Energy Storage System and On-Site Substation (Document Ref: 2.6)** and **Illustrative BESS installation cross-section and elevation (Document Ref: 2.10)** subject always to overriding functional, safety and environmental requirements. • In accordance with the **Outline Battery Safety Management Plan (Document Ref: 7.2)**, the BESS will incorporate fire detection and suppression measures. Furthermore, the final layout will incorporate twin accesses, the interior and perimeter of the BESS will be completely free of vegetation,

	• The number of aerial rigid tanks are to be determined as part of detailed design, however, this is likely to either be two 120m^3 tanks or four 60m^3 tanks with a total capacity of 240m^3. • Rainwater harvesting will be used where feasible. This will be confirmed as part of detailed design. • The reservoir located at National Grid Reference: TF 14404 47190 will be retained for irrigation of onsite habitats and will be available to first responders. The reservoir has a volume of approximately 27,276 cubic metres.	the spacing between each unit will conform to National Fire Protection Association 855 and there will be clear level areas near the perimeter retained for first responders to set down equipment. • The BESS and Onsite Substation will be co-located on a shared development platform with shared drainage, perimeter circulation for vehicles, and a uniform style of security fencing to the entire perimeter. • The BESS and Onsite Substation will have shared welfare and parking facilities for visitors where practicable, for space efficiency. • A single interpretation signboard will be provided along the permissive path if it passes in the vicinity of the BESS to explain the function of the infrastructure. • Rainwater harvesting will be used where feasible. • Data cables will be installed to allow monitoring during operation. • It has been assumed for the purposes of this Application that the chosen BESS design will be based on a lithium-ion battery cell type, however, the exact technology and system will be determined at the detailed design stage. • The enclosures and compounds forming part of the BESS will be white, grey or green in colour. • All buildings and infrastructure will incorporate flood resilient design and construction principles where practical.
Work No. 3 — development of an onsite substation and associated works	• The shape of the Onsite Substation will be defined as part of detailed design and will not exceed an area of 40,000m2. The footprint of the single Onsite Substation compound is likely to take the form of either a rectangle or a square with the following dimensions: • Rectangle: up to 250m x 160m and a height of up to 13m; or • Square: up to 200m x 200m and a height of up to 13m. • The Onsite Substation would have up to 4 HV transformers and is expected to include a control building, office space, welfare facilities, a 33kV switchroom as well as operational monitoring and maintenance equipment and equipment for reactive compensation and/or harmonic filtering. The design control building and office/welfare will be defined as part of detailed design. • There will be up to 4 HV Transformers with a footprint of up to 15m x 9.5m and height of up to 10.5m.	• The external appearance will be similar to the illustrative figures **Illustrative Layout Plan of Battery Energy Storage System** and **On-Site Substation (Document Ref: 2.6), Land take options (Bicker Fen substation) (Document Ref: 2.26)** subject always to overriding functional, safety and environmental requirements. • The BESS and Onsite Substation will have shared welfare and parking facilities for visitors where practicable, for space efficiency. • All buildings and infrastructure will incorporate flood resilient design and construction principles where practical.
Work No. 4 — works in connection with electrical cabling and associated compounds	• Underground cabling is the adopted standard and proposed option. • The cable will be up to approximately 13km in length.	• Land utilised in the construction phase that is not required for the operational life of the Proposed Development will be reinstated to its previous use as far as practical and in consultation with landowners.
Work No. 5 — works to the existing Bicker Fen National Grid substation to create a new generation bay and substation extension		• The external appearance and general approach to the layout will be similar to **Bicker Fen Substation layout (Document Ref: 6.2.27), Bicker Fen Substation sectional drawings (Document Ref: 6.2.28)** and **GIS building drawing (Bicker**

		Fen substation) (Document Ref: 6.2.29) subject always to National Grid Electricity Transmission plc's user requirements and other overriding functional, safety and environmental requirements.
Work No. 6 — various ancillary works relating to the Solar Array Area, including cabling, fencing, security features, access tracks, watercourse crossings and landscaping and biodiversity mitigation measures	• Low voltage electrical cabling will be required to connect PV modules and BESS to inverters (typically via 1.0/1.5kV DC cables), and inverters to the onsite transformers (typically via 0.4/1kV AC cables). Dimensions of cable trenches is up to 1.2m in width and between 0.8m and 1.6m in depth (in limited locations, the depths can be increased to 2.5m or over to account for local anomalies). • Higher voltage cables will be required between the transformers and switchgear and from switchgear to the substations. Dimensions of cable trenches is up to 1.2m in width and up to 1.6m in depth (in limited locations, the depths can be increased to 2.5m or over to account for local anomalies). • Higher voltage cables will share trenches with lower voltage cables on the same route, where possible. • Onsite cabling between PV modules and inverters will be above ground level, placed along row of racks fixed to mounting structure, placed underground, between racks and inverters. All other onsite cabling will be underground wherever possible. • Data cables will be installed to allow monitoring during operation. • Perimeter fencing will be up to 3m high consisting of post and wire, deer fencing. • Pole mounted internal-facing closed circuit television (CCTV) systems to be deployed around perimeter of the operational Solar Array Area of the Site; anticipated to be 5m high. • Motion detection security lighting will be used along with infrared lighting provided by the CCTV security system. Lighting at the BESS and Onsite Substation will be passive infrared (PIR) operated, calibrated to detect vehicles and personnel. All visible lighting will be 50W, installed at a maximum height of 4m with downward light fittings to prevent light spillage. • Acoustic fence: If required around the BESS infrastructure this would be up to 4m high. • Security fence: This would be installed around substation compounds and other electrical infrastructure / compounds. Security fence to be up to 3.4m high. Concrete beam to be 0.35 m below ground.	• The detailed permissive path routing will maximise recreation opportunities and connect existing Public Rights of Way in the area during operation and being separated from residential properties insofar as is possible. The route will be determined via the discharge of a Requirement in Schedule 2 of the **draft DCO (Document Ref: 3.**1), but approximately running in a south easterly direction along Car Dyke then heading south west on the north side of Hodge Dike. • The crossing of ditches will be similar to **Illustrative Permanent bridge designs for Bridges over Watercourses (Document Ref: 2.18)** and **Illustrative Details for Fence on Perimeter of Solar Array Site (Document Ref: 2.30)**. • A number of interpretation boards will be provided, spaced out appropriately along the permissive path to describe particular elements of the Proposed Development or particular natural features, and to provide safety information in the vicinity of existing engineered embankments to drainage ditches/dykes. • The final Biodiversity Net Gain Strategy will be based on the submitted **Biodiversity Net Gain Strategy (Document Ref: 7.3)** and must be substantially in accordance with the **Outline Landscape and Ecological Management Plan (Document Ref: 6.3 ES Vol.2, 6.3.19)**. • Fences will be designed to provide adequate security while keeping landscape and visual impact to a minimum through measures such as keeping them behind hedgerows where possible.
Work No. 7 — construction and decommissioning compounds in connection with Work Nos. 1, 2 and 3		• Land utilised in the construction phase that is not required for the operational life of the Proposed Development will be reinstated to its previous use as far as practical in consultation with landowners.
Work No. 8 — works to create the Bespoke Access Road	• A Bespoke Access Road from the A17 to the Solar Array Area, comprising a 6m wide carriageway, will be provided to facilitate the construction, operation/maintenance and decommissioning phases of the Proposed Development. The carriageway will be widened on	• Waterbodies will be retained. • Land utilised in the construction phase that is not required for the operational life of the Proposed Development will be

	some bends to a width of 8m, to allow for the passage of abnormal loads, and for two way Heavy Goods Vehicle (HGV) traffic. Additionally, overrun areas will be provided where necessary for abnormal loads. • The Bespoke Access Road will be approximately 3.2km in length. • Fencing will be required along the boundary of the working area during construction and gates will be installed at the entry points to prevent unauthorised access. However, this is subject to detailed design. Gates will also be present where the road crosses Asgarby Road and Heckington Road.	reinstated to its previous use as far as practical and in consultation with landowners. • Street lighting, road markings and other street furniture are not proposed except at times or in locations strictly required for safety purposes. • The Bespoke Access Road will in general have the appearance of a farm track or rural driveway, though wider. • Gates will be of a suitable specification to prohibit unauthorised access. • The Bespoke Access Road will have type 1 granular surfacing. • Safe crossing points will be designed for each PRoW at each point it crosses the Bespoke Access Road. • Safe crossing points will also be incorporated at suitable locations along the Bespoke Access Road to enable continued agricultural practices within the surrounding fields.
Work No. 9 — areas of habitat management	• Perimeter fencing will be up to 3m high consisting of post and wire, deer fencing.	• The final Biodiversity Net Gain Strategy will be based on the submitted **Biodiversity Net Gain Strategy (Document Ref: 7.3)** and must be substantially in accordance with the **Outline Landscape and Ecological Management Plan (Document Ref: 6.3 ES Vol.2, 6.3.19)**.
Work No. 10 — works to facilitate access to Work Nos. 1 to 9	• Access tracks will be between 3.5 metres and 9 metres wide. • Access tracks located adjacent to drainage ditches will incorporate the necessary ecological; Environment Agency and/or Internal Drainage Board buffers where required. • Access tracks will have 1:2 gradient slopes on either side.	• Internal access tracks will have compacted stone/gravel surfacing.